

REMARKS

Claims 19-34 and 36-38 are pending in this application, of which claims 34, 37 and 38 have been withdrawn from consideration as being drawn to a nonelected species. Claim 35 was cancelled in a previous amendment. Claims 19-33 and 36 stand rejected. Claim 19 is objected to by the Examiner. The specification and drawings are also objected to by the Examiner.

In view of the preceding amendments and the following remarks, reconsideration of this application is respectfully requested.

Drawing Objections

In the Office Action dated May 6, 2011, The Examiner objected to the drawings, "because the drawings filed on 4/24/06 are not formal and not compliance w/ 37 CFR 1.121(d)". Applicant has created new formal drawings which are enclosed herewith.

The Examiner also objected to the drawings as "failing to comply with 37 CFR 1.84(p)(4) because reference character "1" has been used to designate both wafer and first flat support". Applicant respectfully submits that reference numeral 1 was used to designate the wafer throughout the disclosure, with the exception of the Abstract. In the Abstract, reference numeral 1 was used to designate a "first flat support", which is a generic reference to the wafer 1 as discussed elsewhere in the specification. Applicant has submitted a replacement Abstract which includes no reference numerals. Applicant respectfully submits that no changes to the drawings are required relative to the use of reference numeral 1.

The Examiner also objected to the drawings for failing to show every feature of the invention specified in the claims. Applicant respectfully submits that the "flat support

element" recited in claim 19 is the support element 9 shown in the original drawings. Applicant has amended claim 19 to explicitly include this element in the apparatus, and also to consistently refer to this element as the "flat support element of the apparatus".

Regarding "a third positioning device" as recited in claim 22, this has been added to drawing figure 1 and the list of references as element 19, ejection device positioner. Applicant respectfully submits that the addition of this element does not introduce new matter, as a positioner for the ejection device was discussed in paragraphs [0012] and [0033] of the original disclosure, along with claim 22.

Regarding "an evaluation device" as recited in claim 32 and "a control device" as recited in claim 33, these have been added to drawing figure 1 and the list of references as elements 17 and 18, respectively. Applicant respectfully submits that the addition of these elements does not introduce new matter, as the evaluation device and the control device were discussed in paragraph [0013] of the original disclosure, along with claims 32 and 33.

Elements 17, 18 and 19 are discussed briefly in a new paragraph provided in the preceding specification amendments.

Please replace the three original drawing sheets with the enclosed replacement sheets. Accordingly, it is respectfully requested that the drawing objections be withdrawn.

Specification Objections

In the Office Action dated May 6, 2011, the Examiner states that the title of the invention is not descriptive and a new title is required. Applicant has submitted a new title in the preceding specification amendments.

The Examiner also stated that the abstract should be in a single paragraph and away from other text. Applicant respectfully submits that the abstract was originally provided in a single paragraph on its own page, the last page of the application as filed. Applicant has provided a replacement abstract in the preceding specification amendments, where the amended abstract does not include reference numerals, and the parenthetical reference to "(Fig. 1)" has also been eliminated.

The Examiner also provided guidelines on the arrangement of the specification. Applicant respectfully submits that the content and arrangement of the specification were sufficient as filed, but the specification as filed did not include section headings. Applicant has amended the specification accordingly, including all appropriate headings. No new matter has been added.

The Examiner also noted a discrepancy in the use of reference numeral 1, where both the wafer and the first support are sometimes referred to with the number. As discussed above, Applicant has eliminated reference numerals from the abstract, resulting in consistent use of reference numeral 1 to designate the wafer.

In view of the preceding amendments, it is respectfully requested that the specification objections be withdrawn.

Claim Objections

The Examiner objected to claim 19, stating on page 6 of the 5/6/2011 Office Action, "'A positioning apparatus, comprising: for transferring at least one electronic component from" (claim 19, lines 1-2) should be changed to: "-- A positioning apparatus for transferring at least one electronic component comprising:--".

Applicant has made the required change in the preceding claim amendments. In view of the amendment, it is respectfully requested that the claim objection be withdrawn.

Rejections under 35 USC §112

The Examiner rejected claims 19-33 and 36 under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This rejection is respectfully traversed. The Examiner states on page 7 of the 5/6/2011 Office Action, "It is unclear as to what being referring as " a flat support element of the apparatus" (claim 19, line 13). Please be more specific. Note that the apparatus is being claimed and there is no connection between the above and the apparatus." The Examiner goes on to state, "Whether or not "a support element" (claim 19, line 13) is a part of the claimed first flat support (claim 19, line 3). Please clarify."

In the preceding claim amendments, Applicant has amended claim 19 to remove any ambiguity between the "first flat support" and the "flat support element (of the apparatus)". As discussed previously, the "first flat support" is a generic reference to the wafer 1 described in the specification and shown on figure 1. The "flat support element of the apparatus" is referring to support element 9 described in the specification and shown on figure 1. The "first flat support" (wafer 1) and the "flat support element of the apparatus" (support element 9) are distinct and separate elements of the claimed apparatus, as discussed throughout the specification. Applicant respectfully submits that the amendments to claim 19, described above, eliminate any indefiniteness issues with claim 19 and its dependents and overcome the §112, second paragraph, rejection.

The Examiner also states, "the camera devices" (claim 20, line 11) lacks antecedent basis." Applicant has amended claim 20 in the preceding claim amendments to eliminate the plural reference to camera devices. Applicant respectfully submits that the preceding amendment resolves the antecedent basis issue with claim 20 and overcomes the §112, second paragraph, rejection.

The Examiner goes on to state, "Further, claim 20 recites " its support plane ... is calculated from: ... of the second support" (lines 6-11) is not understood since the claims directed to an apparatus rather than the operation functions." Applicant respectfully submits that the passage cited by the Examiner is a legitimate functional limitation of the apparatus claim. MPEP 2106 (IV.) B states, "Note that an apparatus claim with process steps is not classified as a "hybrid" claim; instead, it is simply an apparatus claim including functional limitations. See, e.g., *R.A.C.C. Indus. v. Stun-Tech, Inc.*, 178 F.3d 1309 (Fed. Cir. 1998) (unpublished)." Applicant therefore respectfully submits that the §112, second paragraph, rejection is not appropriate, and that no changes to claim 20 are necessary in this regard.

Finally, the Examiner states, "The scope of claims 26-27 is not clear because these claims do not further limit the claimed apparatus." Applicant respectfully submits that claim 26 includes an additional element relative to its parent claim 23, and claim 27 includes further elements and limitations relative to its parent claim 26. Applicant therefore respectfully submits that the §112, second paragraph, rejection is not appropriate, and that no changes to claims 26 and 27 are necessary in this regard.

In view of the preceding remarks, it is respectfully requested that the §112, second paragraph, rejections be withdrawn.

Rejections under 35 USC §103

The Examiner rejected claims 19-33 and 36 under 35 USC §103(a) as being unpatentable over Tutsch (German Patent No. DE 19738922) in view of Yearsley (U.S. Patent No. 4,896,418). This rejection is respectfully traversed.

Applicant's independent claim 19 claims a positioning apparatus for transferring at least one electronic component, comprising a first flat support, a second flat support which extends parallel to the first flat support, wherein the apparatus is configured for transferring at least one electronic component from the first flat support to at least one predetermined bond location on the second flat support, a flat support element of the apparatus, positioned to provide structural support for the second flat support, a camera device configured for detecting position data of the at least one predetermined bond location and of the at least one electronic components to be removed from the first flat support; and an ejection device for removing the at least one electronic component from the first flat support by an ejection movement, wherein the camera device, the flat support element of the apparatus, the second flat support, the first flat support, and the ejection device, in this order, are arranged along a common straight line, and wherein the flat support element of the apparatus is optically transparent, and wherein at least a portion of the second flat support is optically transparent to allow the camera device to make optical contact with both the at least one electronic component to be removed and the at least one predetermined bond location.

Claim 19 has been amended in the preceding listing of claims to explicitly recite the flat support element of the apparatus (emphasized above), as discussed previously. Claim 19 has also been amended for other reasons of formality.

German Patent No. DE 19738922 issued to Tutsch discloses a device and procedure to equip a lead frame with integrated circuits. A foil 4 is clamped into a movable carrier unit 3. The foil 4 has attached numerous integrated circuits or chips 2. The chips 2 are to be transferred to a particular spot on a lead frame 1, which is manipulated by a guide unit 5. A camera 7 detects positions of the chips 2 and the lead frame 1, and commands actuation of an ejector 6 at the appropriate time, where the ejector 6 presses an individual chip 2 onto the lead frame 1 where it adheres. An articulating blank holder 8 provides support behind the lead frame 1 when the ejector 6 presses the chip 2 into place. Two pieces of the blank holder 8 slide apart to allow the camera 7 to make optical contact with the chips 2, the lead frame 1 and the ejector 6 below.

U.S. Patent No. 4,896,418 issued to Yearsley discloses a method for placing reverse mounted semiconductor bars 13 on a lead frame 31 wherein the semiconductor bar 13 is placed in the target area and accurately positioned by an alignment system including a video camera 33 which views the semiconductor bar 13, through a transparent "Z" stage 32 for positioning the bar for mounting, during the time of placement of the bar, and optionally a second video camera is used to monitor the position of the lead frame 31 during mounting. When alignment is achieved the "Z" stage 32 actuates and presses the semiconductor bar 13 into engagement with a mounting surface 30 of the lead frame 31.

Applicant respectfully submits that claim 19 is not obvious over Tutsch in view of Yearsley. On pages 7 and 8 of the 5/6/2011 Office Action, it is the Examiner's position that Tutsch discloses the positioning apparatus of claim 19, except for the optical

transparency of the flat support element of the apparatus and the second flat support.

The Examiner then states:

Further, regarding wherein the first flat support element is optically transparent, and wherein at least a portion of the second flat support is optically transparent to allow the camera device to make optical contact with both the at least one electronic component to be removed and the at least one predetermined bond position. The Yearsley discloses the use of transparent material for support stages (see col. 3, lines 39-43). Therefore, It would have been obvious to one having an ordinary skill in the art at the time of the invention was made to have utilized the Yearsley's teaching as described above onto the invention of Tutsch in order to form a positioning device having the transparent supports for accurately positioning and aligning of the substrate component.

However, Applicant respectfully submits that Yearsley does not teach or disclose using transparent material for either the second flat support or the flat support element of the apparatus. What Yearsley describes, in column 3, lines 36-43 and elsewhere, is making the "Z" stage 32 out of a transparent material. In Yearsley's device, the "Z" stage 32 is equivalent to the ejection device of Applicant's claimed invention. That is, the "Z" stage 32 is the device that presses the chip onto the substrate at the appropriate time. In Yearsley's device, the camera 33 is behind the "Z" stage 32, thus making transparency of the "Z" stage 32 essential for proper optical contact of the camera 33 with the semiconductor bar 13 and the lead frame 31.

In contrast, in Applicant's claim 19, the second flat support and the flat support element of the apparatus are transparent. The second flat support is the substrate onto which the chip is to be placed, while the flat support element of the apparatus is the support element which provides structural support to the second flat support while the chip is being pressed into place. Applicant's claimed invention includes transparent materials for these parts so that "the camera device arranged therebelow can continue

to make optical contact with the bond contacts arranged thereabove, the chip to be removed and the ejection device, in order to detect the position data thereof" (paragraph [0014]). Yearsley does not require either of his equivalent elements – the lead frame 31 or the track 43 – to be transparent, as these elements do not obstruct a line of sight between the camera 33 and either the semiconductor bar 13 or the "Z" stage 32. Because Yearsley's device is inverted from Applicant's claimed device (Yearsley has camera 33 behind "Z" stage 32 with both on the one side of the semiconductor bar 13 opposite the lead frame 31, while Applicant has the camera on the opposite side of the substrate and wafer from the ejection device), there is no teaching or motivation for Yearsley to make the lead frame 31 or the track 43 transparent.

Furthermore, Applicant's claimed device requires both the flat support element of the apparatus and the second flat support to be transparent so that optical contact can be made by the camera with the exact mounting location of the bond contacts on the substrate ("predetermined bond location on the second flat support"). Yearsley is not concerned with mounting a chip directly onto bond contacts, but rather just placing a semiconductor bar in a mounting area on the lead frame. This is described in column 3, lines 21-25, "After the semiconductor bar has been attached to the lead frame mounting area 30, the semiconductor is appropriately connected to the leads 32, after which the leads are detached or cut away from the mounting base 30 and frame 31." The lack of bond contacts on Yearsley's lead frame 31 provides further disincentive for Yearsley to make the flat support element of the apparatus and the second flat support transparent.

MPEP 2142 states, "To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." (Emphasis added.)

As discussed above, Applicant respectfully submits that neither Tutsch nor Yearsley teaches or discloses "wherein the flat support element of the apparatus is optically transparent", or "wherein at least a portion of the second flat support is optically transparent to allow the camera device to make optical contact with both the at least one electronic component to be removed and the at least one predetermined bond location", as in Applicant's claim 19. Applicant further submits that neither Tutsch nor Yearsley provides any motivation to use transparent material for either the second flat support or the flat support element of the apparatus, as Tutsch moves his "flat support element of the apparatus" (blank holder 8) out of the way to allow the camera a clear view, and Yearsley's apparatus has a different arrangement of elements relative to the camera which obviates the need to see through the second flat support or the flat support element of the apparatus.

The Examiner goes on to state:

Additional to the above, regarding optically transparent materials for supports. It would have been an obvious matter of design choice to choose any desired materials including the above since applicant has not disclosed that such optically transparent materials for supports would solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the type of materials as taught by the combination of Tutsch and Yearsley as indicated above.

Applicant respectfully submits that it would not "have been an obvious matter of design choice to choose any desired materials including the above". Applicant also

respectfully disagrees with the Examiner's contention that "applicant has not disclosed that such optically transparent materials for supports would solves any stated problem or is for any particular purpose". On the contrary, paragraph [0013] of Applicant's original disclosure states, "According to one preferred embodiment, the strip-shaped substrate is made of an optically transparent material or of a partially perforated material, in order thus to allow the camera device to make optical contact from below with the chip to be removed and the ejection device." (Emphasis added.)

Furthermore, paragraph [0014] of Applicant's original disclosure states, "According to one preferred embodiment, a flat support element, preferably made of optically transparent material, for supporting part of the strip-shaped substrate is arranged between the camera device and the strip-shaped substrate arranged thereabove. By using a transparent material, the camera device arranged therebelow can continue to make optical contact with the bond contacts arranged thereabove, the chip to be removed and the ejection device, in order to detect the position data thereof." (Emphasis added.)

Applicant respectfully submits that the above two excerpts clearly describe the particular purpose of selecting transparent materials for the second flat support (substrate strip 2) and the flat support element of the apparatus (support element 9), as claimed in claim 19. Namely, the purpose is to allow the camera device to be able to maintain optical contact with the elements above – the bond contacts on the second flat support, the chip to be removed from the first flat support, and the ejection device. Applicant further submits that Tutsch actually teaches away from using transparent materials by way of his disclosure of a two-part blank holder 8 (equivalent to Applicant's

flat support element of the apparatus), where Tutsch solves the problem of a clear line of sight from the camera to the other elements by moving the blank holder 8 out of the way, rather than making it from a transparent material. For these reasons, Applicant therefore respectfully submits that it would not “have been an obvious matter of design choice to choose any desired materials”.

As outlined above, Applicant respectfully submits that neither Tutsch nor Yearsley discloses, teaches or provides any motivation to use transparent material for either the second flat support or the flat support element of the apparatus. Applicant further submits that it would not have been an obvious matter of design choice to choose any desired materials (specifically an optically transparent material) for the second flat support and the flat support element of the apparatus. For these reasons, Applicant respectfully submits that independent claim 19 is not obvious over Tutsch in view of Yearsley.

Dependent claims 20-33 and 36 were also rejected under 35 USC §103(a) as being unpatentable over Tutsch in view of Yearsley. As discussed above, Applicant respectfully submits that independent claim 19, from which claims 20-33 and 36 depend, is not obvious over Tutsch in view of Yearsley. Applicant therefore respectfully submits that, for at least this reason, claims 20-33 and 36 cannot be obvious over the same references.

Furthermore, the Examiner did not provide any explanation for the rejection of claim 22, which has been amended to correct a typographical error. Applicant respectfully submits that neither Tutsch nor Yearsley disclose or teach “a third positioning device connected to the ejection device for positioning the ejection device

with respect to the common straight line by displacing the ejection device in a direction parallel to the first and second flat supports", as in Applicant's claim 22. More specifically, both Tutsch and Yearsley disclose only a "Z" motion (perpendicular to the first and second flat supports, not parallel to them) for the ejection device. For this additional reason, Applicant respectfully submits that claim 22 is not obvious over Tutsch in view of Yearsley.

In view of the preceding remarks, it is respectfully requested that the §103(a) rejection be withdrawn.

Conclusion

It is now believed that this application is in condition for allowance. If personal contact with Applicant's representative would expedite prosecution of this application, the Examiner is invited to call the undersigned.

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